ANALYSIS OF ^{136}Xe-H RELEASE FROM INTERSTELLAR DIAMONDS AT PYROLYSIS. A. V. Fisenko and L. F. Semjonova, V. I. Vernadsky Institute of Geochemistry and Analytical Chemistry, Russian Academy of Science, Moscow, Russia.

The kinetic release of ^{136}Xe excess from interstellar diamonds at their pyrolysis was studied. For this purpose the Xe data of Huss and Lewis [1] in 11 chondrite diamonds were used. For calculations of the ^{136}Xe excess it was assumed: (1) Xe in the diamonds is a mixture of the P1, P3, Xe-H, and Xe-L components; (2) the ratio of ^{136}Xe/^{130}Xe for P1 and P3 components is equal to 1.95. This value is the average for the data of the P1 component (see Table 5 in [1]) and it nearly coincides with those for P3 component [1]. On the basis of the calculation for each temperature fraction of the ^{136}Xe excess (designated as ^{136}Xe-H), the integral curves of the ^{136}Xe-H release were constructed. Then, from these curves, the release temperatures of 25%, 50%, and 75% total ^{136}Xe in diamonds were determined for each chondrite. These data are shown in Fig. 1a from two groups relative to Orgueil, with the exception of Semarkona's data. The temperature values for these groups are shown in Fig. 1b. They were calculated as the average from data for the diamonds in each group. The diamond group with the high ^{136}Xe release temperature (Indarch, Leoville, Kainsar, and Bishunpur) was marked as GH, and the other group (Vigarano, Mezoe-Madaras, Qingzhen, Tieschitz, and Allende) as GL. The GL group have temperatures that are similar to those for the Orgueil diamond, but the interval of the ^{136}Xe-H release for GL is wider. According to the release temperatures of 25% and 50% ^{136}Xe-H, the Semarkona diamond is located between the GH and GL groups, while at the 75% temperature it coincides with the GL group.

The GH group has diamonds with a different content of the P3 component [2]. Therefore, the difference between groups is not connected with phase-bearing of this component. The higher pyrolysis temperature of the GH-group diamonds is not connected with variation of N content in diamonds either, because in the GL and GH groups there are diamonds with low N content (e.g., Allende, Indarch, Tieschitz, Leoville [3]). It should be noted that the temperature values in Fig. 1 are not essentially changed if the P6 component abundance in diamonds is taken into consideration.

It is possible that the lower thermostability of the GL-group diamond grains in comparison to those for the GH group is because the GL-group chondrites preserved the diamond grains that were strongly affected by corrosion. The corrosion could be a result of the diamond grain reacting with different oxides during both aqueous alteration of chondrite matter and thermal metamorphism. Probably in the range of each GL-group chondrite the diamond grains were affected by corrosion to a different degree. This led to the observed broad interval of the ^{136}Xe-H release temperature for GL-group diamonds. Perhaps the Orgueil diamond grains were also exposed to corrosion as a result of the strong aqueous alteration.

Thus the ^{136}Xe-H release temperatures from interstellar diamonds at pyrolysis can be used as an indicator of metamorphism conditions in chondrites.

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References: [1] Huss G. and Lewis R. (1994) *Meteoritics, 29*, 791. [2] Huss G. and Lewis R. (1994) *Meteoritics, 29*, 811. [3] Russell S. et al. (1996) *Meteoritics Planet. Sci., 31*, 343.

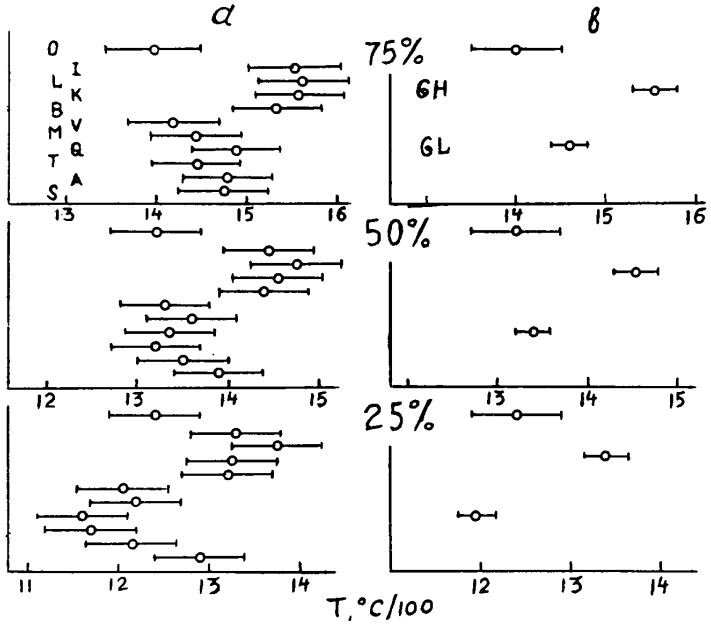

Fig. 1. The release temperatures of 25%, 50%, and 75% total ^{136}Xe-H: (1) at pyrolysis of the interstellar diamonds from Orgueil (o), Indarch (I), Leoville (L), Kainsaz (K), Bishunpur (B), Vigarano (V), Mezoe-Madaras (M), Qingzhen (Q), Tieschitz (T), Allende (A), and Semarkona (S) chondrites; (2) for the GH and GL groups relative to the Orgueil diamonds.